Result Page

The invention relates to a circuit or a component of it for a refrigerant, in particular from aluminium.

It is known to plan to the increase of the corrosion resistance of heat-transfer agents for the cooling within the range of fuel cells coatings at the contact areas of conduits, in particular flat tubing or pipingpiping pipings, and at the collecting tanks for the cooling water. Here the coatings must prevent furthermore that a certain threshold value of the electrical conductivity of the cooling water is not exceeded, in order not to impair the function of the fuel cell. In particular in connection with direct methanol fuel cells it comes due to the formation from formic acid to a low pH value of the refrigerant and in the operation to a significant stress of the heat-transfer agents.

In order for example proposed will protect, the circuit to bind by Ionentauschern the released ions. This Ionentau however regular changed must become.

Furthermore coatings become proposed such as green chromate finishing or however the use of special aluminium alloys.

On the other hand inorganic-organic hybrid polymers (ORMOCER TM e or Nanomere TM) are known, bspw from the region of the lacquers. also as corrosion protection layers used to become to be able. These materials become synthesized after the sol gel process, whereby becomes constructed by controlled hydrolysis and condensation of organic modified SI alkoxides first an inorganic network. A Cokondensation with other metal alkoxides (Ti, Zr, aluminum alkoxides) is likewise possible. In a subsequent step the polymerizable groups fixed at the inorganic network become and. A. thermal and/or. UVinitiated crosslinked with one another. In addition organic modified SI alkoxides can become inserted, which are not received organic polymerization reactions and so that to an organic functionalization of the inorganic network contribute. By this 2-step method an inorganic becomes organic copolymer constructed. A hydrolysis and a condensation from silicon alkoxides to the generation of inorganic oxide networks are in the following shown.

▲ top

Hydrolysis
SI (OR) 4 + n H2O -> SI (OR) 4-n (OH) n + n R OH

Condensation
(OR) 3Si-OR + HO-SI (OR) 3 -> (OR) 3Si-O-Si (OR) 3 + HEAR
(OR) 3Si-OH + HO-SI (OR) 3 -> (OR) 3Si-O-Si (OR) 3 + H2O

It is object of the invention, a circuit or a component of it for a refrigerant, in particular a circuit from aluminium to improve.

This object becomes dissolved by a circuit or a component of it with the features of the claim 1.

A circuit or a component becomes according to invention of it for a refrigerant, in particular from aluminium, provided, with which the region standing with the refrigerant in contact is provided with a coating from an inorganic-organic hybrid material, in particular with a coating from Nanokompositen, in particular ORMOCER TM EN and/or Nanomeren TM. This concerns in particular a refrigerant circuit of a heat-transfer agent, bspw. to the cooling of fuel cells, or individual components of it, which come with the refrigerant into contact, as bspw. the inner surfaces of conduits or collecting tanks.

Such coatings offer to a good corrosion protection and cling to good on metal surfaces, on the other hand can them by means of conventional wet lacquer procedures applied become and to hard with relative low temperatures out. Furthermore they are in all rule toxicological acceptable.

Preferably the coating exhibits a thickness of 10 micrometres or less, in particular between 1 and 5 micrometres, why only a small obstruction of the heat transfer made.

Preferably the coating exhibits fillers, in particular particles, fibers or fabrics. Here in particular a silicate filler is in connection with Nanokompositen suitable. The silicate filler in the coating can be present in the form of overlapping panels.

Preferably made pickling of the surface before applying the coating, so that disturbing elements such as z, which can be coated. B. Fluxing agent remainders of distant become.

Preferably so coated conduits for heat exchangers in connection with fuel cells, direct in coolant channels in fuel cells, become in particular in polymer electrolyte or direct methanol fuel cells, or as connecting members between the components of a gas cell cycle, used.

In the following the invention becomes in detail explained on the basis two embodiments.

In accordance with the first embodiment will a heat-transfer agent for the cooling within the range of fuel cells, in particular direct methanol fuel cells, provided, which exhibits flat tubes from aluminium with a continuous central mittelsicke (pipepipe pipes) to the conduit of the cooling water, between those rib packages arranged are, in order to be able to deliver the warm one transferred by the fuel cells to the cooling water as effective ones as possible to the air again. The flat tubing packages are reciprocal from collecting tanks surrounded, which preferably consist of aluminium.

In order to protect the pipepipe pipes and the collecting tanks against corrosion by the cooling water and to keep the electrical conductivity small, the pipepipe pipes and the collecting tanks are inside, D. h. provide in the regions, which stand with the cooling water in direct contact, with a coating.

The coating becomes by an inorganic-organic hybrid material formed, in the present case by a Nanokomposite with a filler, in the present case a silicate filler. The thickness of the coating amounts to depending upon solid content between 1 and 5 micrometres. The silicate filler has the form of panels, which overlap themselves in the coating in this case.

In accordance with the second embodiment cooling agent lines provided inside a fuel cell and connecting conduits between the components of the circuit are with a corresponding coating. The coating becomes by an inorganic-organic hybrid material formed, in the present case by a Nanomer TM. The thickness of the coating amounts to depending upon solid content between 1 and 5 micrometres.

Applying the o. g. Coatings made by means of a conventional wet lacquer procedure, bspw. by immersion, spraying, spin coating etc. and subsequent hardening with temperatures of bottom 200 DEG C, in particular with temperatures around 130 DEG C (thermal cure). Alternative one can take place a cure of the coating via UV irradiation or an redox-initiated cure.

▲ top

In particular with NOCOLOK soldered heat-transfer agents made before applying the coating a removal of fluxing agent layers, bspw. by means of pickling, in order to ensure an optimum coating. Furthermore surfaces before applying the coating, which can be coated, should become degreased.

Europäisches Patentamt
European Patent Office
Office européen des brevets

Claims of DE10213756	Print	Copy	Contact Us	Close

Result Page

1. Circuit or component of it for a refrigerant, in particular from aluminium, characterised in that the circuit or the component in the region standing with the refrigerant in contact with a coating from an inorganic-organic hybrid material is provided.

2. Circuit or component according to claim 1, characterised in that Nanokomposite, in particular ORMOCER TM e and/or Nanomere TM, which form coating.

3. Circuit or component after one of the preceding claims, characterised in that the coating a thickness of 10 micrometres or less, in particular between 1 and 5 micrometres, exhibits.

4. Circuit or component after one of the preceding claims, characterised in that the coating of fillers exhibits.

5. Circuit or component according to claim 4, characterized by a silicate filler.

6. Circuit or component according to claim 4 or 5, characterized by a filler in the form of panels.

7. Circuit or component according to claim 6, characterised in that the panels overlap themselves.

8. Circuit or component after one of the preceding claims, characterised in that the refrigerant deionized water is.

▲ top 9. Circuit or component after one of the preceding claims, characterised in that the refrigerant with antifreezes and/or corrosion inhibiters offset is.

10. Method to the applying a coating in accordance with one of the claims 1 to 9, characterised in that before applying the coating the surface which can be coated is pickled.

11. Use of an heat exchanger in a circuit in accordance with one of the claims 1 to 9, in particular for a motor vehicle.

12. Use of a fuel cell, in particular a polymer electrolyte or a direct methanol fuel cell, in a circuit in accordance with one of the claims 1 to 9.

13. Use of connecting members between the components of a gas cell cycle in accordance with one of the claims 1 to 9.